An Examination of the Psychometric Properties of the Exercise Identity Scale and its Adaptation to Physical Activity

For correspondence:
denver.brown@utsa.edu

Denver M. Y. Brown[1] and Alan Meca[1]

[1]Department of Psychology, University of Texas at San Antonio, 1 UTSA Circle, San Antonio, TX, 78254, USA

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ABSTRACT

Research has shown exercise identity is one of the strongest predictors of physical activity behavior. However, exercise is a subset of the broader construct of physical activity and therefore existing measures such as the Exercise Identity Scale may underestimate the relationship between identity and physical activity behavior. This study investigated whether exercise and physical activity identity are conceptually distinct factors, the most appropriate factor structure of the Exercise Identity Scale, and the predictive utility of the best measurement model for understanding physical activity behavior. A total of 647 undergraduate students (Mean age = 19.54 ± 1.86 years; 61% female, 36% male, 3% other) completed an online survey that included the Exercise Identity Scale, a modified version of the Exercise Identity Scale specific to physical activity and the International Physical Activity Questionnaire – Short Form. Confirmatory factor analysis indicated that substantive correlations between physical activity and exercise identity. Moreover, as indicated by the bifactor model, although there was a certain degree of multidimensionality, the preponderance of variance was captured by a general physical activity and exercise identity factor. Finally, this

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Authors DB @*TheDenverBrown* and AM @*Dr_AMeca* can be reached on Twitter.

general factor accounted for significant variance in physical activity. Collectively, these findings suggest the Exercise Identity Scale and its modified physical activity version can be used interchangeably without sacrificing our understanding of the strength of the identity – physical activity behavior relationship. The most appropriate factor structure for exercise identity, however, remains unclear and future research is needed among more diverse samples recruited outside of physically active contexts.

INTRODUCTION

It is well established that physical activity participation confers benefits for various facets of health (Pearce et al., 2022; Warburton & Bredin, 2017), yet the prevalence of insufficient physical activity remains high globally (Guthold et al., 2018). For instance, in the United States, it is estimated that only 23.5% of adults meet the public health recommendations of 150 minutes of moderate-to-vigorous intensity aerobic exercise and two sessions of muscle strengthening activities, with even greater disparities associated with certain sociodemographic factors (Bennie et al., 2019). Such rates of physical activity guideline adherence are a major public health concern (Blair, 2009) and place a considerable economic burden on societies (Ding et al., 2016). Collectively, mounting evidence supports the need for continued efforts to increase physical activity behavior, however, our current understanding of physical activity determinants and how we measure these constructs may be a limiting factor.

The field of exercise psychology has put forth several theoretical approaches that have been used to explain physical activity behavior and inform the development of physical activity interventions. Some of the most popular theories (e.g., Social Cognitive Theory, Theory of Planned Behavior, Transtheoretical Model) that have been applied to understand physical activity behavior are rooted within a social cognitive framework (Rhodes et al., 2019). The key shortcoming of social cognitive theories, however, is that they generally position intention formation as the proximal determinant of physical activity behavior. Yet evidence has consistently shown that intentions to engage in physical activity are often not sufficient to facilitate action (Rhodes & de Bruijn, 2013; Rhodes & Dickau, 2012). This phenomenon is referred to as the intention-behavior gap (Sheeran & Webb, 2016) and has sparked the emergence of several action control theories that integrate post-intentional processes to help explain why people often fail to translate their physical activity intentions into action (Rhodes, 2017; Schwarzer, 2008).

Regulatory processes such as action planning and coping planning were integrated within initial action control models as key mechanisms underlying the intention-behavior gap (Schwarzer, 2008). More recently, Rhodes' (2017) Multi-Process Action Control framework has extended beyond regulatory processes to also include reflexive processes (i.e., automatic, less conscious) such as habit and identity, which develop as a consequence of repeated action control over time. Identity, specifically, has shown promise as one of the strongest (r = 0.44) predictors of physical activity behavior according to meta-analytic evidence (Rhodes et al., 2016). These findings demonstrate what makes sense intuitively; the more salient one's identity, the more likely they are to act in accordance with it. Having a strong sense of identity related to physical activity is therefore expected to favorably shape future physical activity participation through one's values, roles, and beliefs. Although research investigating identity (or self-schemas) in a physical activity context dates back to the late 1980s (Kendzierski, 1988), this construct has received far less attention compared to constructs specified within social cognitive theories (e.g., attitudes, perceived behavioral control, intention) and knowledge gaps exist.

One under investigated issue within the physical activity identity literature relates to measurement. Specifically, existing identity measures are all framed in the context of exercise behavior as opposed to the broader construct of physical activity: the Exercise Identity Scale (Anderson & Cychosz, 1994), Exercise Self-Definition Scale (Hays et al., 2005) and Exercise Schema Questionnaire (Kendzierski, 1988). The Exercise Identity Scale is the most popular of these three instruments. Initial research using the Exercise Identity Scale focused on understanding leisure time exercise behavior (Anderson et al., 1998, 2001; Anderson & Cychosz, 1994; Cardinal & Cardinal, 1997), however, it has since been commonly used to explain the broader construct of physical activity behavior (Barkley et al., 2020; Golaszewski et al., 2022; Liu et al., 2021; Strachan et al., 2005). This is problematic because exercise is defined as "a subset of physical activity that is planned, structured, and repetitive and has as a final or an intermediate objective the improvement or maintenance of physical fitness" (Caspersen et al., 1985). Therefore, an instrument such as the exercise identity scale may lack predictive utility when used to explain physical activity behavior because respondents are prompted to consider only one aspect of their identity related to physical activity despite multiple domains of physical activity having been established (i.e., transportation, occupation, household, leisure time). As a result of this limitation, our current understanding of the strength of the relationship between identity and physical activity behavior may in fact be underestimated.

Some researchers have recognized the disconnect between using exercise identity to explain physical activity behavior. To circumvent this issue, items within the exercise identity scale have been modified (e.g., "I consider myself as someone who is physically active") to capture the broader construct of physical activity (Kwan et al., 2022; Rhodes et al., 2021; Strachan et al., 2010). However, to the best of our knowledge no attempts have been made to evaluate whether a modified physical activity version of the Exercise Identity Scale is conceptually distinct from the original instrument, and if so, whether the same 2-factor model consisting of role identity and beliefs exists (Wilson & Muon, 2008). Perhaps most importantly, if the modified physical activity version of the Exercise Identity Scale is conceptually distinct from the original instrument, it is unknown which instrument explains a greater amount of the variance in physical activity behavior.

To advance our understanding of the role identity plays for physical activity behavior, the aforementioned knowledge gaps need to be addressed. Thus, the aims of the present study were threefold. First, we evaluated whether adapting the exercise identity scale to refer to the broader construct of physical activity (i.e., physical activity identity) resulted in a conceptually distinct factor from the original Exercise Identity Scale. Second, we examined potentially competing conceptualizations of identity related to physical activity and exercise to determine which is the superior fit. More specifically, we evaluated a unidimensional 1-factor model versus a 2-factor physical activity and exercise identity model. Additionally, although exercise identity was originally represented as a unidimensional construct (Anderson & Cychosz, 1994), more recent work suggests exercise identity is best represented as a bidimensional construct consisting of role identity and exercise beliefs (Vlachopoulos et al., 2011; Wilson & Muon, 2008). As a result, we also evaluated a 2-factor role identity and exercise beliefs model across the physical activity and exercise identity items and a four-factor and bifactor model to better ascertain which model best represents the constructs of exercise identity and physically active identity. Finally, after determining the best fitting model, we investigated its utility for predicting physical activity behavior. We hypothesized that physical activity identity would be conceptually distinct from exercise identity, demonstrate a similar 2-factor model akin to previous findings of Wilson and Muon (2008) and lastly, would account for more variance in physical activity behavior than exercise identity.

METHOD

Study sample and data collection

A total of 647 undergraduate students (Mean age = 19.54 ± 1.86 years; 61% female, 36% male, 3% other) participated in the present study. Participants were recruited from a psychology participant pool and received credit towards their grade for participation, which involved completing an online survey hosted on Qualtrics. The study protocol was approved by an institutional review board and all participants provided informed consent prior to participation. Within the sample, participants identified as the following race/ethnicities: 35% Hispanic, 24% Multiracial, 19% White, 11% Black, 9% Asian, and 2% Other. According to the Centers for Disease Control and Prevention (2022) adult body mass index definitions, 6% of the sample was classified as underweight, 53% as normal weight, 22% as overweight, 18% as obese, and 1% of values were missing. As per the Physical Activity Guidelines for Americans (US Department of Health and Human Services, 2018), 56% of participants were considered physically active based on their self-reported physical activity behavior (i.e., ≥150 min of weekly moderate-to-vigorous physical activity), whereas 12% were considered insufficiently active and 32% were inactive.

Measures

Demographics. Participants reported demographic variables assessing their age, gender, race/ethnicity, height (m) and weight (kg). Height and weight values were used to calculate each participant's body mass index (BMI; weight/(height^2)), which was then coded into underweight, normal weight and overweight/obese based on established BMI classification cut points as per the Centers for Disease Control and Prevention (2022).

Exercise identity. Exercise identity was measured using the Exercise Identity Scale (Anderson & Cychosz, 1994). This scale consists of nine items that were rated on a 7-point Likert scale with responses ranging from 1 (strongly disagree) to 7 (strongly agree). Although exercise identity was originally understood to be a unidimensional construct (Anderson & Cychosz, 1994), work since its development has suggested that a 2-factor model consisting of role identity and exercise beliefs provides a more accurate representation of this construct (Wilson & Muon, 2008). All items and their corresponding factor from the 2-factor model are presented in Table 1.

Physical activity identity. Physical activity identity was measured using an adapted version of Anderson and Cychosz's (1994) Exercise Identity Scale. Like the Exercise Identity Scale, the modified version of the Exercise Identity Scale, hereafter referred to as the Physical Activity Identity Scale, consisted of nine items that were rated on a 7-point Likert scale with responses ranging from 1 (strongly disagree) to 7 (strongly agree). All items and their corresponding factor from the 2-factor model are presented in Table 1.

Physical activity behavior. Physical activity behavior was assessed using the International Physical Activity Questionnaire Short Form (IPAQ-SF) (Booth, 2000; Craig et al., 2003). The IPAQ-SF consists of seven items, six of which assess the frequency (days) and duration (hours and/or minutes on an average day) of their moderate and vigorous physical activity as well as walking performed in bouts of greater than 10-minutes over the past seven days and a seventh item which assesses how much time an individual spends sitting during an average weekday. The six physical activity-related items were used to calculate metabolic equivalent minutes per week (weekly MET min) by multiplying the MET value for a given activity (walking = 3.3, moderate-intensity physical activity = 4, vigorous-intensity physical activity = 8; Ainsworth et al., 2000) by the minutes the activity was carried out and the number of days that the participant indicated engaging in that activity (e.g., 3.3 MET [walking] X 30 min X 3 days = 297 weekly MET min) and summing the MET minutes per week for walking, moderate-, and vigorous-intensity physical activity. As per the scoring rules for the IPAQ-SF, daily activity times were capped to 180 minutes for any participants who exceeded 3 hours or 180 minutes of walking, moderate or vigorous physical activity per day.

Data analysis

The analytic process was conducted in Mplus v8.0 (Muthén & Muthén, 2017) using a Robust Maximum Likelihood estimator. Missing data was minimal (0% to 1%) and handled with full-information maximum likelihood estimation (FIML; Collins et al., 2001). Model fit was evaluated using the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). According to values suggested by Little (2013), good fit is represented as RMSEA ≤ .06, CFI ≥ .95, and SRMR ≤ .06; adequate fit is represented as RMSEA = .06-.08, CFI = .90-.95, and SRMR = .06-.08; and mediocre fit is represented as RMSEA = .08-.10, CFI = .85-.90, and SRMR = .08-.10. It should be noted, although we report the chi-square, we did not use it to gauge model fit because it tests a null hypothesis of perfect fit, which is rarely plausible with large samples or complex models (Davey & Savla, 2010).

In order to establish whether exercise and physical activity identity represented a unitary construct or separate dimensions, we utilized confirmatory factor analysis (CFA) to estimate several models starting with a unidimensional 1-factor model. Across all models, we included residual correlations between corresponding physical activity and exercise identity items to account for similar wording. Next, we estimated two 2-factor models, one in which items for physical activity and exercise identity loaded on two separate factors, and another in which the items loaded on to either the Role Identity or Exercise Beliefs dimensions of exercise identity as per previous work of Wilson and Muon (2008). Next, we estimated a 4-factor model consisting of Physical Activity Role Identity, Physical Activity Beliefs, Exercise Role Identity, and Exercise Beliefs. For the purposes of model identification, the variance of each factor was set to 1.0. To compare these models, we relied on the ΔCFI (>.010) and ΔRMSEA (>.010) criteria to determine significant change in model fit (Little, 2013). In interpreting the factors, a cutoff of ≥.40 was used to determine salient loadings.

Additionally, we estimated a bifactor solution that posited a primary affirmation factor with four lower order specific factors (i.e., Physical Activity Role Identity, Physical Activity Beliefs, Exercise Role Identity, and Exercise Beliefs) that account for potential shared construct specific variance (Reise et al., 2007). However, because the 4-factor model and the bifactor model are not nested, consistent with recommendations of Reise et al. (2007), we had to rely on a variety of indicators that estimate the degree to which each factor contributes to the reliable variance. Specifically, we utilized three model-based indicators; the percent of uncontaminated correlations (PUC), percent of explained common variance (ECV), and the coefficient omega hierarchical (ωH) values (Reise et al., 2010). The PUC represents percentage of covariance that reflects variance from the general dimension whereas the ECV represents the proportion of all common variance explained by a specific factor. Finally, ωH reflects the percentage of variance attributable to individual differences in each factor. For the specific factor, ωH reflects the proportion of reliable systematic variance of a subscale after partitioning out the variability attributed to the general factor. In interpretating, when PUC and the ECV value is greater than .70, common variance can be regarded as largely unidimensional (Rodriguez et al., 2016).

Beyond these model-based indicators, parameter estimates can serve to also determine the adequacy of a bifactor model. For example, in addition to standardized factor loadings, we utilized the item explained common variance (IECV) which represents the extent to which the variance of a specific item is accounted for by the general dimension alone. Per recommendations by Reise et al. (2010), items loading more strongly onto the general factor than on their respective specific factor provides support for unidimensionality. In contrast, items loading more strongly onto their specific factor than the general factor would indicate presence of multidimensionality. Regarding IECV, values greater than .80 suggest a unidimensional item.

Finally, after determining the optimal model, we utilized structural equation modeling to determine the differential utility of the modified physical activity version of the exercise identity scale versus the original instrument in account for variance within physical activity as accounted for by weekly MET min. Similar to CFA models, model fit was determined according to values suggested by Little (2013), with good fit represented as RMSEA ≤ .06, CFI ≥ .95, and SRMR ≤ .06; adequate fit represented as RMSEA = .06-.08, CFI = .90-.95, and SRMR = .06-.08; and mediocre fit represented as RMSEA = .08-.10, CFI = .85-.90, and SRMR = .08-.10. Additionally, gender, age, ethnicity/race, and BMI were included as covariates.

RESULTS

Establishing the Dimensionality of Physical Activity and Exercise Identity

As indicated in Table 2, using the nine physical activity-specific items and the nine exercise-specific items, the purely unidimensional 1-factor model was associated with mediocre to adequate fit [χ^2 (126) = 937.669, p < .001; RMSEA = .100; CFI = .897; SRMR = .052]. Factor loadings for the model ranged from .578 to .901. Next, we estimated two separate 2-factor models using the nine physical activity-specific items and the nine exercise-specific items. The first, which separated Physical Activity Identity from Exercise Identity (i.e., Model 1a), was still associated with mediocre-to-good fit [χ^2 (125) = 653.612, p < .001; RMSEA = .081; CFI = .897; SRMR = .052], but represented a significant improvement upon the 1-factor model [ΔRMSEA = .019; ΔCFI = .036]. Although all items significantly loaded onto their respective factors (.602 to .902), the inter-factor correlation between Physical Activity and Exercise Identity was high (r = .936).

Similarly, the 2-factor model consisting of role identity and beliefs (i.e., Model 2b) was also associated with nearly identical mediocre-to-good fit [χ^2 (125) = 661.694, p < .001; RMSEA = .082; CFI = .932; SRMR = .039] and also represented a significant improvement upon the 1-factor model [ΔRMSEA = .018; Δ CFI = .035]. All items also significantly loaded onto their respective factors (.596 to .925). Moreover, similar to the Exercise and Physical Activity 2-factor model, although to a lesser degree, the inter-factor correlation between Physical Activity and Exercise Identity was high (r = .876).

Next, we estimated a 4-factor model consisting of Physical Activity Role Identity, Physical Activity Beliefs, Exercise Role Identity, and Exercise Beliefs. The 4-factor model was associated with adequate-to-good fit [χ^2 (120) = 333.410, p < .001; RMSEA = .053; CFI = .973; SRMR = .034] and was a significant improvement on both of the 2-factor models [ΔRMSEA = .029-.029; Δ CFI = .040-.041]. Factor loadings ranged from .719 to .937. Despite this, it is worth noting that inter-factor correlations ranged from .788 to .938, potentially indicating a lack of multidimensionality.

Given the findings from the 4-factor model, we then proceeded to estimate a bifactor model consisting of a general Physical Activity/Exercise Identity factor and four specific factors capturing the unique variance accounted by the four subscales. As indicated in Table 2, the bifactor model was associated with adequate-to-good model fit [χ^2 (108) = 333.410, p < .001; RMSEA = .070; CFI = .957; SRMR = .042]. The PUC was at .765 and ECV of the general factor was .865, suggesting that 76% of the covariance reflected variance from the general dimension and that the general Physical Activity/Exercise Identity factor accounted for 86% of the variance across all items, indicating common variance can be regarded as essentially unidimensional.

Consistently, at the factor level, ωH for the general factor was .929 whereas the ωH ranged between .047 to .131 for the specific factors indicating the specific factors only accounted for a small proportion of the variance after partitioning the variance associated with the general factor. At the individual item level, as reported in Table 3, IECV values for 14 of the 18 items were above .80, suggesting these items were primarily unidimensional. The remaining 4 items had IECV values ranging from .662 to .798. Moreover, the factor loadings for the specific factors ranged from .099 to .492, with only two items (i.e., EIS3 & EIS9) meeting the tradition cut-off for a meaningful loading (i.e., > [.40]). As a whole, although there is some degree of multidimensionality across indicators, there was overwhelming evidence for unidimensionality across domains (i.e., physical activity identity versus exercise identity) and dimensions (i.e., role identity versus beliefs).

Incremental Validity

Despite the preponderance of unidimensionality, given the poor fit associated with the 1-factor model, the bifactor model was put forth as the championed model. As a next step, we examined the degree to which the general and the four specific factors (i.e., Physical Activity Role Identity, Physical Activity Beliefs, Exercise Role Identity, and Exercise Beliefs) accounted for variance in weekly MET min, controlling for age, gender, ethnicity/race, and BMI. The model was associated with good fit [χ^2 (193) = 593.862, p < .001; RMSEA = .058; CFI = .953; SRMR = .046]. Not surprisingly, the general physical activity and exercise identity factor was significantly and positively associated with weekly MET min (β = .443, p <.001). That said, the remaining variance accounted for by the physical activity role identity factor was still positively associated with weekly MET min (β = .267, p = .002). To further probe this finding, given the lack of interpretability associated with this factor, we re-estimated the bifactor model after constraining the effects of the physical activity role identity factor on weekly MET min to 0. The revised model was associated with good model fit [χ^2 (194) = 610.62, p < .001; CFI = .952; RMSEA = .059; SRMR = .046] and there was no substantive drop in model fit [ΔRMSEA = .001; Δ CFI = .001].

DISCUSSION

The results from the present study help to clarify some of the existing measurement and conceptual issues within the literature examining the relationship between identity and physical activity behavior. Perhaps most importantly, and contrary to our predictions, was the finding that physical activity and exercise identity are not conceptually distinct factors. From an application standpoint this suggests that researchers could use the original Exercise Identity Scale and the modified physical activity version interchangeably when investigating physical activity behavior. However, considering the psychometric properties of the Physical Activity Identity Scale have not been extensively tested, it may be most advisable to use the original instrument.

The conceptual overlap observed across these factors also indicates that participants may view the term “exercise” as representative of the broader concept of physical activity. This may be due to individuals struggling to recall less consistent bouts of physical activity that last less than 10 minutes (Matthews et al., 2012) and instead basing their estimates on planned or structured bouts of physical activity. It is also possible that individuals consider physical activity bouts occurring outside of their leisure time as exercise. For instance, someone who cycles to and from work may view this activity as their daily exercise as opposed to active transportation. Taken together, this study calls into question whether there is a conceptual distinction between exercise identity and physical activity identity.

Our findings also lend insight into the factor structure of physical activity and exercise identity. Contrary to our predictions, we found the difference between role identity and beliefs factors was not substantiated, but rather, the original unidimensional measurement model observed by Anderson and Cychosz (1994) was supported. Indeed, as indicated in our 2-factor model, role identity and beliefs were correlated at r = .876 across physical activity and exercise identity items. Even in the 4-factor model, where physical activity and exercise identity were modeled separately, role identity and beliefs were correlated at .837 and .890 for physical activity and exercise identity, respectively. In sum, modeling these factors jointly would be problematic as it has the potential to introduce multicolinearity. This finding is in contrast to research that has endorsed a 2-factor model of exercise identity based on inter-factor correlations of r = .70 to r = .76 (Vlachopoulos et al., 2011; Wilson & Muon, 2008). One potential explanation for the discrepancy in results across these studies may be the samples that were recruited. That is, the studies that observed a 2-factor model both consisted of samples that would be more likely to have stronger exercise identities – undergraduate physical education and kinesiology students (Wilson & Muon, 2008) and adults who exercised at fitness clubs (Vlachopoulos et al., 2011) – compared to our sample, which was recruited from a psychology course credit participant pool. In essence, it is possible that exercise and physical activity identity in individuals with less experience, investment, and/or knowledge is less differentiated. While the 2-factor model fits intuitively within identity theory, it is also possible that this factor structure may be susceptible to restriction of range issues among samples recruited from settings in which participants would be more likely to report higher scores on the Exercise Identity Scale. Future research among more diverse samples is needed to help clarify the most appropriate factor structure of the Exercise Identity Scale.

Providing greater support for the undimensionality of physical activity and exercise identity, our results indicated that it was the general factor that was significantly associated with physical activity behavior. Moreover, the observed effect size was comparable to the medium effect size (r = 0.44) identified in Rhodes et al.'s (2016) meta-analysis of the identity - physical activity relationship. It is worth noting that the residual variance captured by the Physical Activity Role Identity factor was significantly associated with physical activity as well. Given the minimal amount of variance captured by these items, and in light of the general factor, interpretation of this finding should be taken with a note of caution. Indeed, after accounting for the general factor, the minimal residual variance captured by the specific variance may be akin to a correlated measurement effect between similar wording items. With this in mind, the significant association between the Physical Activity Role Identity factor and physical activity behavior may indicate that individuals that tend to endorse these items – irrespective of their physical activity and exercise identity – are engaging in more physical activity behavior. That said, constraining the association between the Physical Activity Role Identity factor and physical activity behavior did not significantly impact model fit. As such, this finding may be nothing more than an artifact of the sample.

Although this study addresses critical knowledge gaps surrounding the measurement of exercise identity, it is not without limitations. First, we employed a convenience sample of post-secondary students and therefore our results may lack generalizability to other populations. It is possible that post-secondary students may struggle to differentiate between exercise versus other types of physical activities and therefore these findings may not hold among other populations. Furthermore, the factor structure of exercise and physical activity identity may be different for individuals who are knowledgeable, capable and have experience with physical activity compared to those who do not. With replication becoming an increasingly important aspect of the scientific process (Nosek et al., 2022), it would be advisable to determine whether these findings are consistent among age groups across the life cycle given that physical activity engagement, awareness of the benefits and physical limitations may be more prominent in certain life stages. Another limitation relates to the modified physical activity identity items used in the present study. It is not outside the realm of reasoning that exercise identity and physical activity identity are distinct constructs given that we simply modified the Exercise Identity Scale items to represent physical activity behavior instead. Research using an inductive (i.e., bottom up) approach to develop new items specific to physical activity identity is warranted and could verify whether these items also load onto a single factor that includes the original Exercise Identity Scale items. Finally, physical activity behavior was self-reported, which may introduce recall errors and/or social desirability bias (Sallis & Saelens, 2000). Future studies should consider using research- or consumer-grade wearable devices to overcome this limitation.

In conclusion, this study provides some important insight into the measurement of exercise identity, with implications for understanding physical activity behavior. Namely, it appears that the Exercise Identity Scale and modified version related to physical activity identity may be used interchangeably to predict physical activity behavior. The most appropriate factor structure of exercise identity remains uncertain though – our findings suggest a unidimensional model may be most appropriate among more diverse samples. Finally, our results underscore the predictive utility of exercise identity as one of the strongest psychological constructs for understanding physical activity behavior. While the focus of this work was to address key knowledge gaps in the identity - physical activity relationship, future work should consider the development of novel identity measures specific to the broader construct of physical activity behavior.

Contributions

Conceptualization (DB, AM), Methodology (AM), Formal analysis (AM), Data curation (DB), Writing – original draft (DB, AM)

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Data and Supplementary Material Accessibility

Data is available upon request.

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Table 1. *The Exercise Identity Scale and modified physical activity version of the Exercise Identity Scale*

Item	Factor	Exercise Identity	Physical Activity Identity
1	Role identity	I consider myself an exerciser	I consider myself someone who is physically active
2	Role identity	When I describe myself to others, I usually include my involvement in exercise	When I describe myself to others, I usually include my involvement in physical activity
3	Exercise beliefs	I have numerous goals related to exercising	I have numerous goals related to being physically active
4	Exercise beliefs	Physical exercise is a central factor to my self-concept	Physical activity is a central factor to my self-concept
5	Exercise beliefs	I need to exercise to feel good about myself	I need to be physically active to feel good about myself
6	Role identity	Others see me as someone who exercises regularly	Others see me as someone who engages in physical activity regularly
7	Exercise beliefs	For me, being an exerciser means more than just exercising	For me, being physically active means more than just engaging in physical activity
8	Exercise beliefs	I would feel a real loss if I were forced to give up exercising	I would feel a real loss if I could not engage in physical activity
9	Exercise beliefs	Exercising is something I think about often	Physical activity is something I think about often

Table 2. *Overview of Model fit for Confirmatory Factor Models (CFA)*

	χ2(df)	RMSEA	ΔRMSEA	CFI	ΔCFI	TLI	SRMR
Model 1 - Unidimensional	937.669 (126)*	.100		.897		.874	.052
Model 2A - Physical Activity vs. Exercise	653.612 (125)*	.081	.019	.933	.036	.918	.049
Model 2B - Role Identity vs. Beliefs	661.694 (125)*	.082	.018	.932	.035	.916	.039
Model 3 - 4-Factor Model	333.410 (120)*	.053		.973		.965	.034
Comparison to Model 2A			.028		.041		
Comparison to Model 2B			.029		.041		
Model 4 - Bifactor Model	447.967 (108)*	.070		.957		.939	.042

Note. * $p < .050$

Table 3. *Parameter estimates for the bifactor model*

Item Name	General Factor	Specific Factor 1	Specific Factor 2	Specific Factor 3	Specific Factor 4	IECV
PAIS1	.845	.319				.875
PAIS2	.755	.256				.897
PAIS3	.649	.327				.798
PAIS4	.778		.125			.975
PAIS5	.644		.099			.977
PAIS6	.845		.333			.866
PAIS7	.561			.298		.780
PAIS8	.664			.184		.929
PAIS9	.637			.283		.835
EIS1	.919			.256		.928
EIS2	.801			.250		.911
EIS3	.688			.492		.662
EIS4	.841				.378	.832
EIS5	.659				.219	.901
EIS6	.891				.372	.852
EIS7	.767				.278	.884
EIS8	.815				.208	.939
EIS9	.693				.411	.740

Note. PAIS = Physical Activity Identity Scale Items; EIS = Exercise Identity Scale Items; item explained common variance (IECV)